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Market Trends in Cured Fish: Implications for Canada's Cured Fish Industry

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PREFACE

The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the Department of Fisheries and Oceans.

ABSTRACT

This paper reviews the history of each of the major methods of fish preservation (curing, canning and freezing). It examines trends in the disposition of catch for human consumption in the world and in Canada. It then focuses on trends in the curing of fish with a view to drawing some conclusions regarding the future of the curing industry in Canada as we approach the end of the century.

RÉSUMÉ

On présente un historique des trois principales méthodes de conservation du poisson, soit le saumurage, la mise en conserve et la congélation. On examine aussi les tendances dans la transformation des prises de poisson destiné à la consommation humaine au Canada et à l'étranger. Les tendances pour ce qui est du saumurage du poisson sont étudiées en détail afin d'en dégager des conclusions sur l'avenir de cette industrie au Canada au cours de la prochaine décennie.

Introduction:

Fish is consumed by humans in one of four ways: cured, canned, frozen or consumed as fresh. Over time, patterns of utilization have shifted with changing tastes and the introduction and development of new preservation technologies.

This paper reviews the history of each of the major methods of fish preservation and examines trends in the disposition of catch in the world and in Canada. It then focuses on trends in the curing of fish with a view to drawing some conclusions regarding the future of the curing industry in Canada as we approach the end of the century.

Historical Background:

The rapid perishability of fish makes its preservation against putrefaction an ongoing necessity. The oldest method of preservation is the curing of fish, either by drying, salting, pickling or smoking. Evidence of preservation of fish by drying and smoking goes back to prehistoric times (Cutting, 1962). Preservation by salt is not likely to have emerged until the Bronze Age, as its production and use imply a more highly organized economy (Cutting, 1962). Right up to the mid-nineteenth century, salting, drying and smoking remained the staple methods of long-term preservation, with pickling in vinegar, first developed by the Greeks, used for short term preservation (Cutting, 1962). These methods of preservation allowed for the development from the Middle Ages onward of large industrialized fisheries in Europe and North America, based on large stocks such as the North Sea herring and the Northwest Atlantic cod (Borgstrom and Paris, 1965; Innis, 1978). The basic methods of curing have persisted virtually unchanged to the present day.

Canning as a method of preservation was first developed in 1809

(Van Den Broek, 1965). Canned goods had the advantage of improved palatability and ease of storage and preparation over cured products and the new technology caught on rapidly. By 1864, canning had been introduced on the Pacific coast of North America (Dewberry, 1954) where abundant supplies of salmon gave rise to a rapid expansion of canned production. The patenting of the pressure retort in 1874 followed by the development of the mechanically pressed-out (as opposed to hand-made) can towards the end of the century led to the industrialization of canning and a rapid rise in the number of fish canneries (van Den Broek, 1965). Today, canning remains an important processing technology for such species as salmon, tuna and sardines.

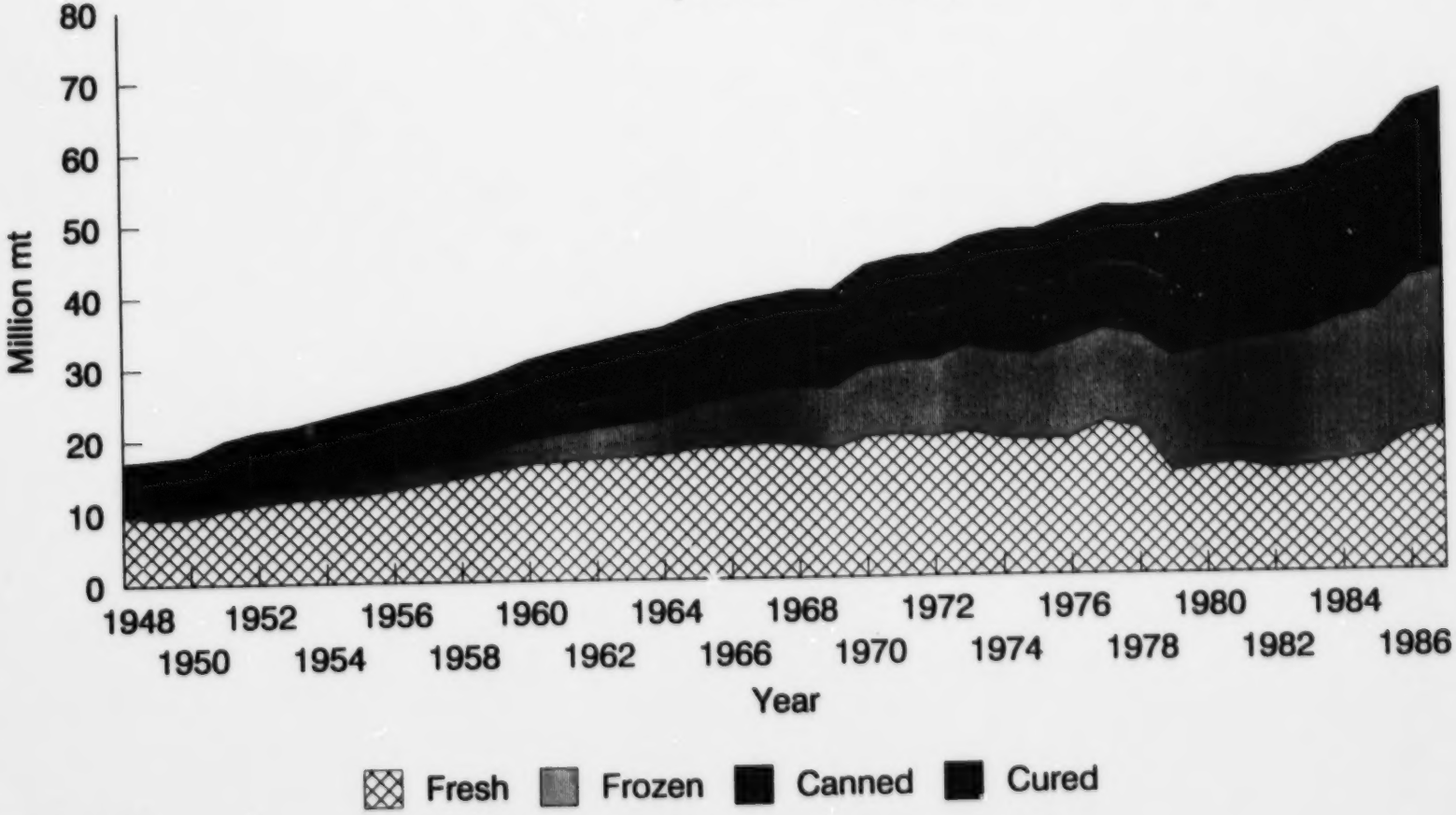
As outlined in Cutting (1962), the freezing of fish by natural means has long been used as a method of preservation in countries with a cold climate. Early in the nineteenth century, ice and salt mixtures were employed for fish freezing. When the compressor was developed in the latter part of the nineteenth century, it was immediately applied to the freezing of fish and rapid development followed. Poor quality resulting from slow freezing led to a series of technological developments such as plate freezing in the 1920's that led to more rapid freezing and better quality products. This laid the foundation for the rapid growth of freezing as the main method of preservation for fish.

In 1987, freezing accounted for 33% of the world's total catch that was processed for human consumption, canning accounted for 17% and curing, 20%, with the remaining 30% consumed as fresh (FAO, 1987).

Trends in the Disposition of Catch:

As outlined in Figure 1, the world's catch of fish and shellfish destined for human consumption grew steadily over the last four decades. Increased catch in turn increased the need to process the

Figure 1: Disposition of World Catch for Human Consumption (1948 - 1987)



Source: FAO

catch into forms other than fresh in order to preserve it. Although the absolute amounts of catch utilized in cured, canned and frozen production increased worldwide over time (see Figure 1), relative shares showed a different pattern. As outlined in Figure 2, the proportion utilized in frozen production grew rapidly. The proportion canned also grew, albeit at a lesser rate. Conversely, the proportion utilized in cured products showed a progressive decline.

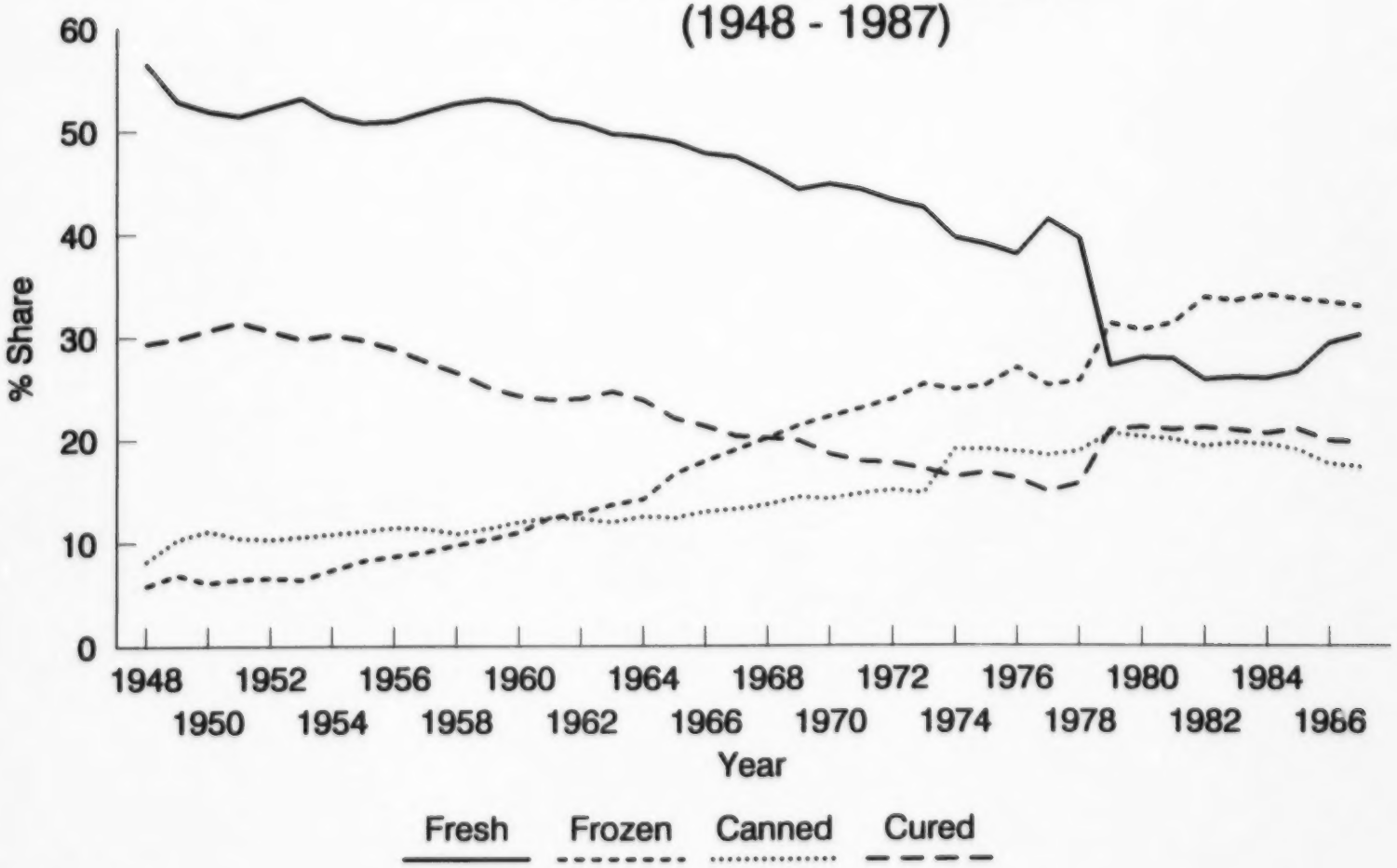
The disposition of Canada's catch shows a similar pattern (see Figures 3 and 4) although the processing of catch into frozen, as opposed to canned or cured product played an even more prominent role over time.

Clearly, the overall pattern that emerges is that newer preservation technologies (e.g. freezing) are displacing the older technologies of preservation (e.g. curing). Changing tastes, increasing use and availability of refrigeration, increasing health consciousness and improved transportation technology are reinforcing this displacement. It would also appear that this displacement is occurring in a predictable pattern. The remainder of this paper will focus more specifically on utilization trends involving the oldest preservation technology, the curing of fish, with a view to drawing some conclusions regarding the future of this industry in Canada as we approach the end of the century.

Trends in Cured Fish:

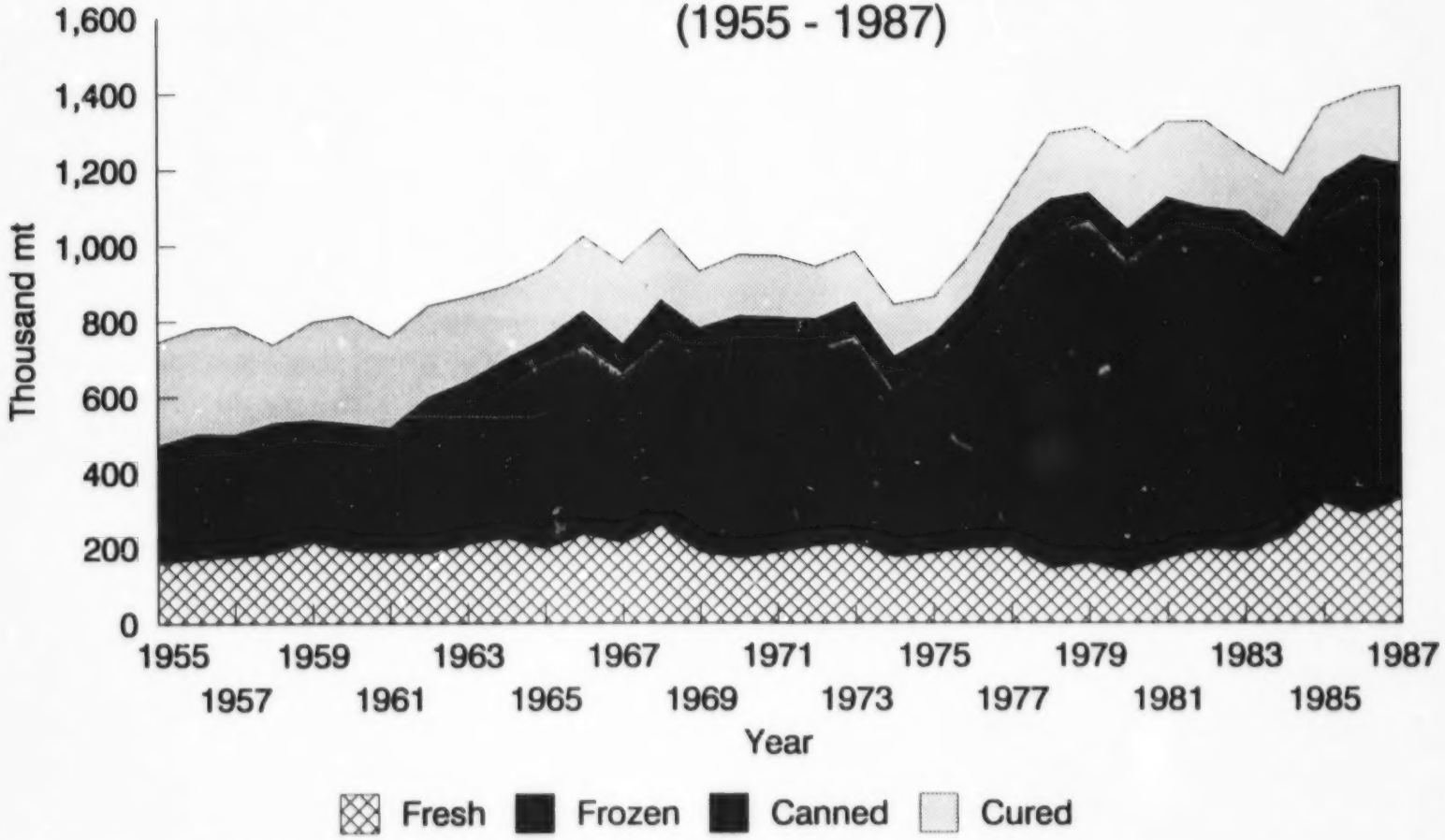
Figure 5 examines declines in the proportion of world and Canadian catch (destined for human consumption) that is cured and declines in the consumption of cured products in the U.S. market over time. In all three cases, the decline has been steady and continuous over a period of many years. However, the rates of decline clearly differ.

Figure 2: Disposition of World Catch for Human Consumption (1948 - 1987)



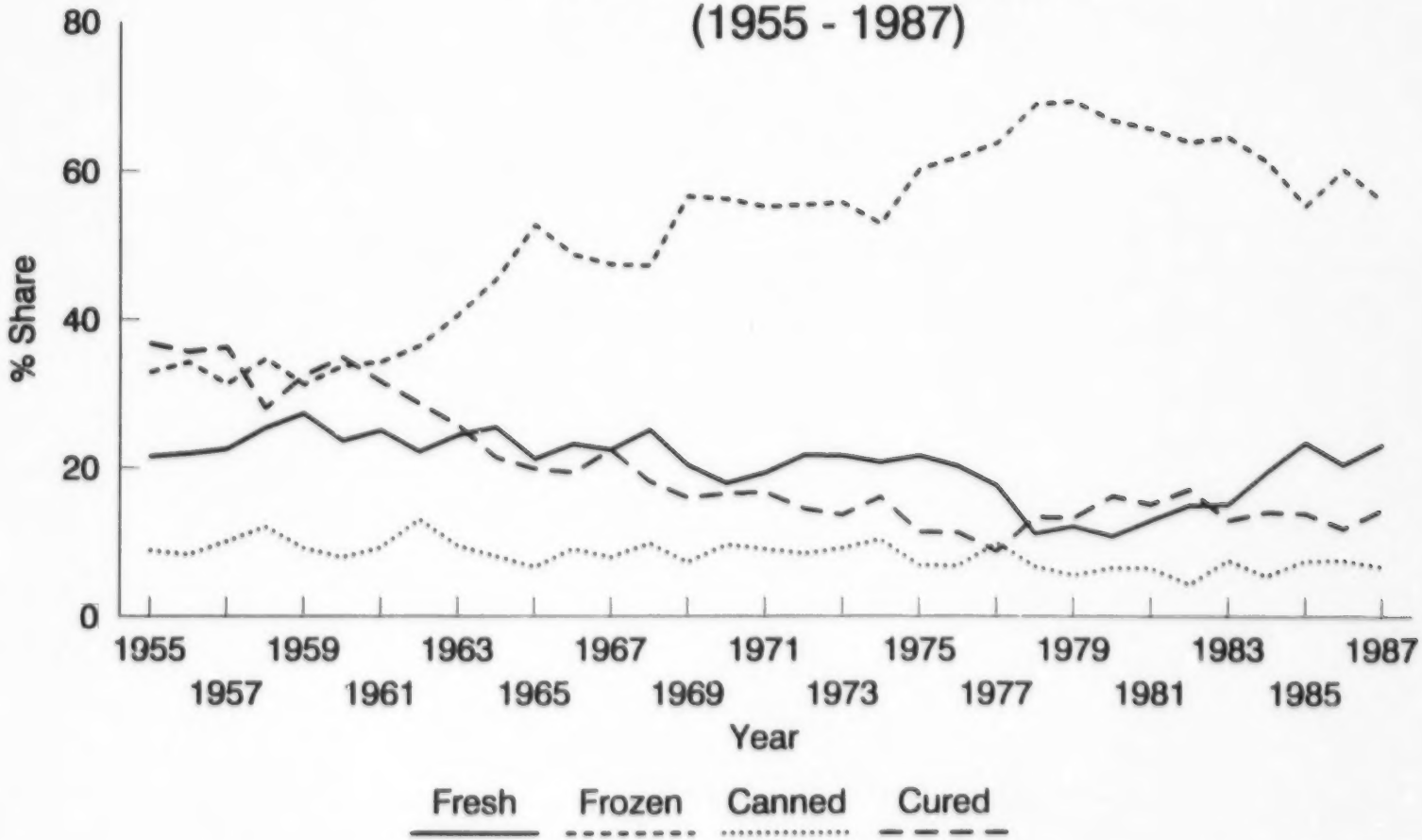
Source: FAO

Figure 3: Disposition of Canadian Catch for Human Consumption (1955 - 1987)



Source: Canadian Fisheries Annual Statistical Review

Figure 4: Disposition of Canadian Catch for Human Consumption (1955 - 1987)



Source: Canadian Fisheries Annual Statistical Review

Based on regression lines fitted to the data (see Figure 5 and Appendix 1), the rate of decline in the proportion of Canadian catch put into cured product exceeds the overall rate of world decline. Instead, it more closely matches the rate of decline in consumption of cured products in the U.S. This makes sense given Canada's high degree of dependency on the U.S. market for its exports of fish products.

Canada exports over 80 per cent of the value of its fishing industry's production ($3.3 billion in 1987). Roughly 60 per cent of all Canadian fish exports are absorbed by the United States. In 1988, 64 per cent of all fish products consumed in the U.S. were fresh/frozen (see Figure 6). Not surprisingly then, over 80 per cent of Canada's catch destined for human consumption was processed as fresh/frozen in 1988.

If trends (see Figure 5 and Appendix 1) are extrapolated to the year 2000, the following declines are forecast:

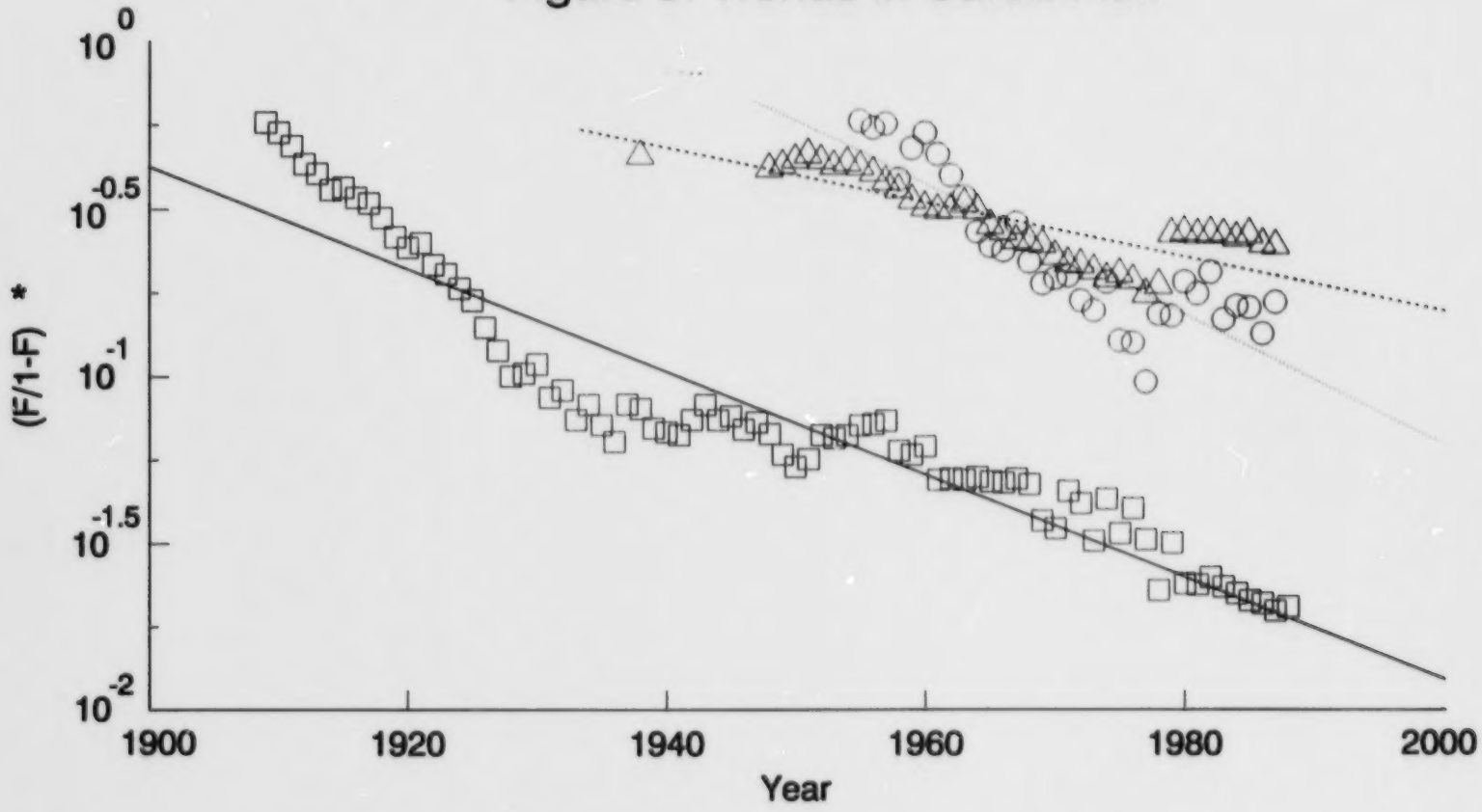
By the year 2000

- the U.S. market share for cured products will decline from 2 per cent (0.3 lb per capita) in 1988 to 1.25 per cent (0.19 lb per capita);

- the proportion of world catch put into cured products will decline from 19.7 per cent in 1987 to 13.9 per cent and;

- the proportion of Canadian catch put into cured products will decline from 15.2 per cent in 1987 to 6 per cent. If catches were to remain constant, this would mean a drop from 215,500mt of catch being cured in 1987 to

Figure 5: Trends in Cured Fish



U.S. Per Capita Consumption for Cured Products

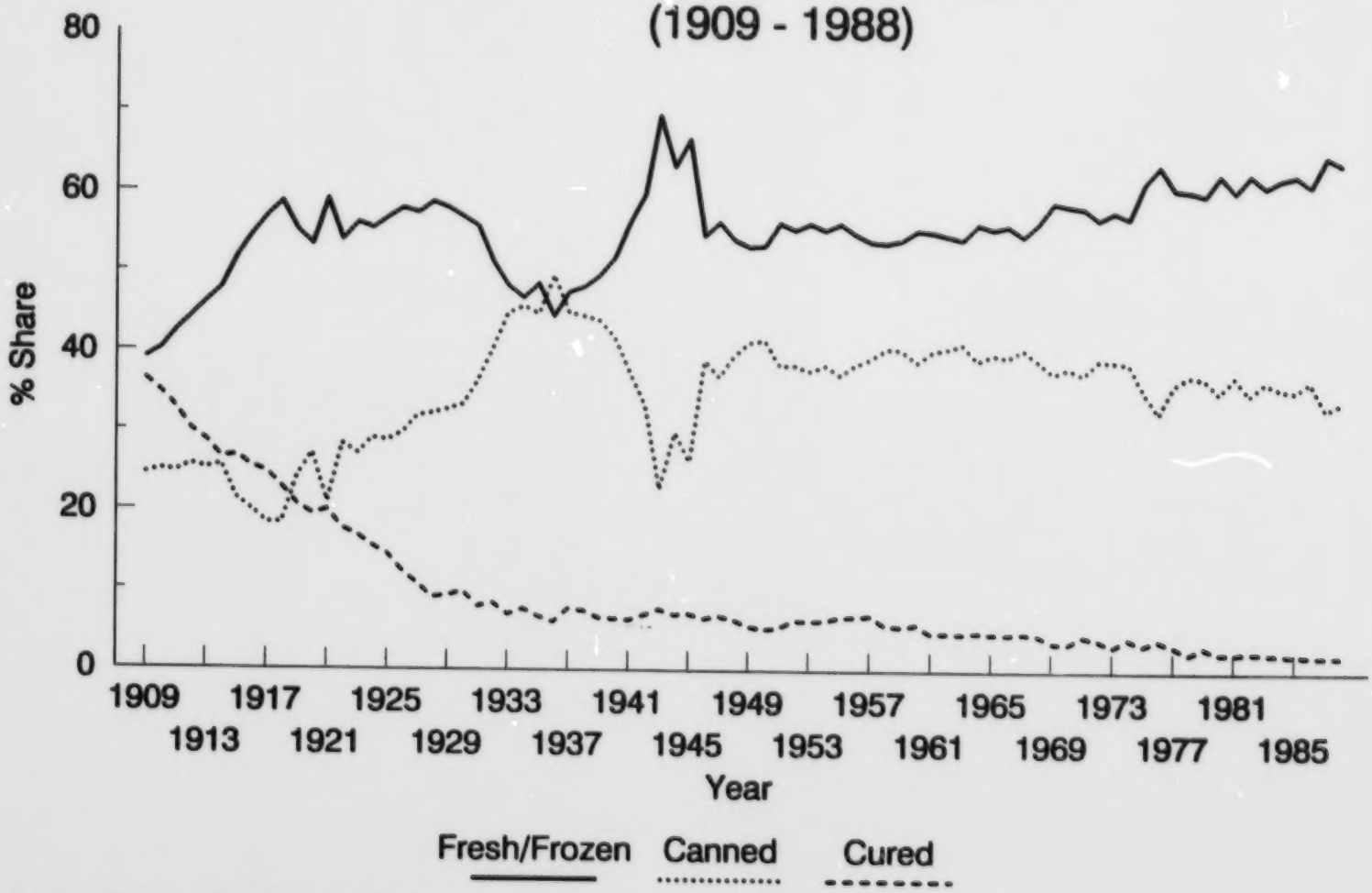
World Disposition of Catch into Cured Products

Canadian Disposition of Catch into Cured Products

Source: Canadian Fisheries Annual Statistical Review; FAO; U.S. Dept. of Commerce

* F = Market Share

Figure 6: U.S. Seafood Market (1909 - 1988)



Source: Fisheries Statistics of the U.S.
U.S. Dept. of Commerce

approximately 83,500mt by the year 2000. Preliminary figures for 1988 indicate that the proportion of catch cured had already declined to 198,300mt, representing 13.6 per cent of the Canadian catch.

Implications:

In 1987, Canada's fish processing industry consisted of 1,265 registered plants employing approximately 38,000 plant workers with a total value of production of $3.3 billion, including approximately $300 million of smoked, pickled, cured and salted seafish. These 1,265 fish plants have 1,947 fresh/frozen, canning and curing processing operations (the number of operations exceeds the number of plants because some plants have more than one operation), of which 44 per cent are curing operations. In certain provinces such as Newfoundland and Nova Scotia, the proportion of processing operations that are curing operations is considerably higher (54 and 55 per cent respectively - see Table 1).

If trends continue, substantial declines in the proportion of Canada's total catch utilized in cured products are likely in the next ten years. This will not be offset by increases in catch, as Canada's traditional commercial fisheries are fully prosecuted and resource prospects are "mixed" (Canadian Department of Fisheries and Oceans, 1988). Nor would a greater development of markets outside of the U.S. reverse this decline. At best, it could only slow it, given the observed world-wide decline in the curing of fish. As well, Canada's proximity to the U.S., coupled with the recently signed Canada-U.S. Free Trade Agreement, will likely ensure Canada's ongoing dependence on the U.S. market in the future.

Yet these trends are in sharp contrast to recent developments in the number of curing processing operations in Canada. Although

TABLE 1: FRESH/FROZEN, CURING AND CANNING OPERATIONS IN CANADA

1979 VERSUS 1987

PROVINCE/REGION	1978 NUMBER OF REGISTERED FISH PROCESSING PLANTS*	1978 PROCESSING OPERATIONS* FRESH/FROZEN NO.	FRESH/FROZEN (% OF TOTAL)	CANNING NO.	CANNING (% OF TOTAL)	CURING NO.	CURING (% OF TOTAL)	1978 TOTAL	1987 NUMBER OF REGISTERED FISH PROCESSING PLANTS*	1987 PROCESSING OPERATIONS* FRESH/FROZEN NO.	FRESH/FROZEN (% OF TOTAL)	CANNING NO.	CANNING (% OF TOTAL)	CURING NO.	CURING (% OF TOTAL)	1987 TOTAL
Newfoundland	202	145	(46.5)	8	(2.5)	158	(51)	311	244	186	(45)	4	(1)	222	(54)	412
Nova Scotia	180	119	(44)	3	(1)	151	(55)	273	307	247	(44.5)	2	(0.5)	305	(55)	554
New Brunswick	86	50	(35)	30	(21)	63	(44)	143	177	111	(44)	21	(8)	122	(48)	254
P.E.I.	41	38	(53)	13	(19)	19	(28)	68	56	52	(55)	14	(15)	28	(30)	94
Quebec	86	64	(57)	13	(12)	35	(31)	112	106	80	(55.5)	7	(5)	57	(39.5)	144
Atlantic Region	584	414	(46)	67	(7)	426	(47)	907	890	676	(46)	48	(3)	734	(50)	1,458
British Columbia	116	119	(66)	22	(12)	40	(22)	181	171	149	(52.5)	16	(5.5)	119	(42)	284
Canada	858	678	(55)	90	(7)	470	(38)	1,238	1,265	1,028	(53)	65	(3)	854	(44)	1,947

Source: Inspection Branch
Department of Fisheries and Oceans, Canada

* Some plants are involved in more than one processing operation. The total number of operations therefore exceeds the total number of plants.

changes in the number of operations are a poor indicator of actual changes in capacity, they can nevertheless be indicative of general trends. From 1979 to 1987, the number of curing processing operations in Canada actually increased from 470 to 854 and the proportion of all processing operations that are curing operations increased from 38% to 44% (see Table 1).

A substantial rationalization is therefore likely in Canada's cured fish industry in the near future. Clearly, not all cured products and operations are at risk. Luxury products such as smoked salmon and speciality products such as cured roes will continue to be in demand. Traditional ethnic markets will continue to consume cured products. Nevertheless, the overall decline in cured fish markets is likely to continue. Trends in historical data examined in this paper indicate that these declines are persistent and are progressing at a steady pace. Certain sectors of Canada's cured fish industry, for example Newfoundland's saltfish industry, are already exhibiting a deteriorating economic performance (Canadian Saltfish Corporation Annual Report, various years).

As cured markets continue to decline, the future of curing will likely be as a complementary technology to the more predominant canning and freezing processing methods. Individual plant proprietors will likely maintain only a limited amount of curing capacity to reach specialty markets and handle glut situations. During the 1990's, only in remote regions such as Labrador will the curing of fish likely persist as the predominant form of processing.

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Appendix 1: Regression Output

1) U.S. Per Capita Consumption of Cured Fish Products:

- Regression Equation: $Log_{10}(F/1-F) = -0.01534(Year)+28.78261$
- Std Err of Y Est = 0.122692
- Std Err of Coef. = 0.000594
- R Squared = 0.895338
- No. of Observations = 80
- Degrees of Freedom = 78

2) Disposition of World Catch into Cured Fish Products:

- Regression Equation: $Log_{10}(F/1-F) = -0.00810(Year)+15.40756$
- Std Err of Y Est = 0.071402
- Std Err of Coef. = 0.000908
- R Squared = 0.671205
- No. of Observations = 41
- Degrees of Freedom = 39

3) Disposition of Canadian Catch into Cured Fish Products:

- Regression Equation: $Log_{10}(F/1-F) = -0.01953(Year)+37.86460$
- Std Err of Y Est = 0.111803
- Std Err of Coef. = 0.002043
- R Squared = 0.746591
- No. of Observations = 33
- Degrees of Freedom = 31